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Which Governance Mechanisms Promote Efficiency in Reaching Poor Clients? Evidence from Rated Microfinance Institutions

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Abstract

This paper evaluates the effectiveness of several governance mechanisms on microfinance institutions' (MFI) performance. We first define performance as efficiency in reaching many poor clients. Following the literature on efficiency in banks, we estimate a stochastic cost frontier and measure output by the number of clients. Therefore, we capture the cost minimization goal and the goal of serving many poor clients, both of which are pursued by MFIs. We next explore the impact of measurable governance mechanisms on the individual efficiency coefficients. The results show that efficiency increases with a board size of up to nine members and decreases after that. MFIs in which the CEO chairs the board and those with a larger proportion of insiders are less efficient. The evidence also suggests that donors' presence on the board is not beneficial. We do not find consistent evidence for the effect of competition, and we find weak evidence that MFIs in countries with mature regulatory environments reach fewer clients, while MFIs regulated by an independent banking authority are more efficient.

Keywords: *microfinance institutions, board, governance, performance, efficiency*

JEL classification: *G*21, *G*30

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1. Introduction

Microfinance institutions (MFIs) provide banking services to the poor. An MFI must serve as many poor customers as possible while remaining financially sustainable. Annual spending on microfinance worldwide amounts to between US$800 million and $1.5 billion (Hartarska and Holtmann, 2006). MFI governance is a challenge to the further development of the microfinance industry (CSFI, 2008) and investors, donors, and governments are looking for effective mechanisms of control to ensure that MFIs make the best use of scarce resources.

While previous studies have estimated the impact of MFI governance mechanisms separately along either social or financial dimensions (Hartarska, 2005; Mersland and Strøm, 2009), this paper takes simultaneously into account *both objectives* of MFIs in evaluating the effectiveness of various governance mechanisms. We take advantage of an approach widely used to study efficiency in banks, modifying it to capture the duality of MFIs (see Allen *et al.*, 2001). We measure performance using efficiency coefficients obtained from a stochastic cost frontier to capture the cost minimization objective of MFIs. Within the cost function, we measure output by the number of clients served in order to capture the outreach objective of serving as many poor clients as possible (see Caudill *et al.*, 2009).

The banking literature suggests that, after directly accounting for input prices, output quantity, technology-specific factors, and country characteristics, the remaining cost inefficiency is managerial (Fries and Taci, 2005; Bos and Kool, 2006). In a second step, the (predicted) individual efficiency coefficients from the cost function estimation are modelled as a function of measurable internal and external governance mechanisms. The

internal governance factors are those related to the MFI board and include its size, representations by various stakeholders and managerial capture. The external factors account for the weak market-disciplining mechanisms in microfinance, such as a lack of private shareholders, the limited role of competition, and differences in regulation.

The results show that MFI efficiency is affected by certain governance mechanisms as suggested in the literature. In particular, MFIs are less efficient when the positions of the CEO and the board chair are merged; similarly, MFIs with a larger proportion of insiders (employees) on the board are less efficient. We also find that efficiency increases with a board size of up to eight or nine members and decreases after that. The evidence suggests that donors' presence on the board is not beneficial, while that of creditors may be. We do not find consistent evidence that competition improves efficiency, although we do find weak evidence that MFIs in countries with mature regulatory environments could reach more clients by operating as a unit regulated by the banking authorities.

The remainder of the paper is organized as follows. Section Two reviews the related literature and lays out the hypotheses to be tested. Section Three describes the empirical methodology. Section Four summarizes the data. The results are discussed in Section Five, while Section Six offers conclusions.

2. Literature Review

The literature has identified various links between firm performance and governance. MFIs operate as either non-profit or for-profit organizations in which shareholders are quasi-owners (large institutional donors) or charities, and seldom regular private investors. Therefore, a brief review of the existing corporate, banking, non-profit, and

microfinance governance literature is used to identify governance mechanisms relevant for MFIs, and to formulate and test empirical hypotheses.

The first empirical study of this topic is Hartarska (2005), who uses survey data from a small sample of MFIs in Eastern Europe and Central Asia (ECA) to study how managerial compensation, board size and composition (stakeholder representation, gender, and skills), prudential regulations, external rating, and auditing affect financial performance. Financial performance is measured by the return on assets, and outreach results are measured by the number of borrowers and the depth of outreach (the clients' poverty level). This study finds that some traditional control mechanisms, such as performance-based compensation, are ineffective, while others, such as board independence, improve performance. This work highlights the importance of identifying better performance measures to capture the dual objective of MFIs, rather than using the traditional accounting-based ROA and number of clients. For example, boards with a higher proportion of donors were found to have lower sustainability but a better depth of outreach, while MFIs with client representation have better sustainability but serve borrowers who are less poor. Hartarska (2005) also does not find consistent evidence that board size, regulation, audits, or ratings affect MFI outreach or sustainability.

Mersland and Strøm (2009) use a larger sample of rated MFIs and study whether and how such aspects of the CEO/chairman duality, female CEOs, international directors, board size, and external factors affect financial performance and outreach. They also find no evidence that typical governance mechanisms work, but their results may also be affected by not measuring simultaneously the dual objective. For example, they find that MFIs with female CEOs have better ROA; that MFIs with dual CEO/chairman positions

have a higher portfolio yield and serve more clients but show no other measurable performance difference; that MFIs with larger boards distribute smaller loans; and that external factors play a limited role at best.

2.1 *Internal governance*

Internal governance includes control mechanisms within the firm, such as the MFI board. In a typical MFI, board members are not paid, but their incentives are aligned with those of stakeholders, because members are legally responsible for effective monitoring. Such board members offer their reputation as collateral and will try to minimize the risk of damaging it (Handy, 1995). Uncompensated board members volunteer their time, because the mission of the organization matters to them. Those no longer committed to the mission leave, and substitutions are made by the remaining board members based on mutually agreed-upon criteria (Fama and Jensen, 1983a). Directors may want to shirk their responsibility or simply get along with managers rather than govern effectively, but peer policing is expected to decrease the incidence of inappropriate board behaviour (Fama and Jensen, 1983b; Holmstrom, 1999).

In practice, MFIs want to identify board members who are able and willing to dedicate the time needed to effectively monitor management (Labie, 2001, 2003). Since MFIs' managers strive to achieve outreach and sustainability, they reveal more information to their boards than what would have been revealed under a single profit maximization objective (Hartarska, 2002). Thus, the board plays an important role in an MFI, and this role is best captured by evaluating the board's impact on a performance measure that captures the dual objectives of such organizations.

A significant part of the empirical literature has focused on the impact of *board size* on firm performance. Since free-riding is more likely in larger boards, there is evidence that larger boards are less effective in corporations as well as in small firms (Yermack, 1996; Eisenberg *et al.*, 1998). Financial intermediaries usually have larger boards than do non-financial firms, but the empirical evidence shows both a positive and negative relation between board size and performance (Adams and Mehran, 2003; Pathan *et al.*, 2007; Belkhir, 2004). Studies on non-profit boards have suggested that larger boards may be more successful because of the additional duties that board members take on in supervising fundraising, but there is no empirical support for this claim (Oster and O'Reagan, 2004).

Cheng (2008) finds evidence that larger corporate boards are associated with less variability in firm performance, because larger boards take longer to reach consensus and their decisions are less extreme. The dual objective of the MFI and the importance of communicating stability to customers in an MFI would suggest that there may be benefits to larger size. Yet thus far, the empirical evidence is mixed. Hartarska (2005) did not find consistent evidence of a positive impact of larger boards on a ROA, or on the number of actual borrowers, while Mersland and Strøm (2009) found weak evidence that MFIs with larger boards offer smaller-sized loans, suggesting the targeting of poorer clients.

Since none of these studies used a measure that captures outreach and sustainability simultaneously, we propose the following hypothesis in its null form. *Hypothesis 1. H0: Board size has no impact on performance*. Moreover, we test for a quadratic relation between size and efficiency to determine whether the no impact results found up to this point were due to a possible non-linear relation between board size and performance.

Board *composition* reflects a board's quality and its ability to monitor and advise the manager (Boone *et al.*, 2007). Several aspects of board composition are usually considered in the literature, and the impact of both *independent directors* and *separated CEO/Board Chair roles* seems most important (Bhagat and Jefferie, 2002).[1] Empirical studies, however, have found both a positive and a negative relation between the proportion of outside directors and firm performance (Mayers *et al.*,1997; Rosenstein and Wyatt, 1997).

The explanation given by the corporate governance literature is that when a firm operates in a noisy environment, board monitoring costs are higher and there will be less monitoring (Demsetz and Lehn, 1985). The empirical findings from high-growth firms show that they have smaller boards with a high proportion of insiders, since outside directors are less effective (Coles *et al.*, 2008). Firms facing greater information asymmetry will have less independent boards because of the higher cost of monitoring (Linck *et al.*, 2008). However, the expected benefits of an inside director's expert knowledge outweigh the expected costs of managerial entrenchment when managerial and outside shareholder interests are closely aligned, usually via equity-based compensation (Rosenstein and Wyatt, 1997). MFIs do not have typical shareholders and do not use high-powered incentives, because such incentives may not be appropriate for managers pursuing double objectives (Holmstrom and Milgrom, 1991; Hartarska, 2005).

[1] Some authors have argued that with endogenously chosen boards, differences in performance may be attributed to specification issues (Hermalin and Weisbach, 2003). Recently, however, a study by Cornett and Tehranian (2008) shows that if a firm's performance is adjusted for earning management, the measured importance of governance variables increases and the impact of incentive-based compensation on corporate performance decreases; thus, the presence of independent outside directors, the institutional ownership of shares, and representation on the board of directors can have a direct impact on performance.

Typically, banks have a larger proportions of outside directors, and empirical work finds that the proportion of independent directors has a positive impact on performance in some banks (Adams and Mehran, 2003; Pathan *et al.*, 2008). In non-profits, boards are comprised mostly of outsiders, so the potential conflict between insiders and outsiders is less relevant.

The collapse of the MFI Corposol/Finansol in Colombia has been attributed to a lack of proper board independence and to poor oversight, both of which allowed too much power to be concentrated in the hands of one executive (Otero and Chu, 2002). For a sample of MFIs in the ECA region, Hartarska (2005) finds that MFIs with a larger proportion of independent directors achieve better outreach, but she finds no effect on financial results. That is why estimating the impact on a measure that captures MFIs' additional objective of outreach is important. Therefore, we form *Hypothesis 2. H0: The proportion of insiders on the board, measured as the proportion of employees on the board, does not affect performance.*

In some MFIs, the CEO is also the chairman of the board, in spite of previous calls to split the role. Such a duality may be a sign of CEO entrenchment (Hermalin and Weisbach, 1991, 1998), since then the CEO may pursue policies that allow him private benefits. While Brickley *et al.* (1997) did not find that firms with a CEO-chairman split outperformed those with a CEO-chairman duality in corporate boards, Mersland and Strøm (2009) found that in MFIs, this duality had a positive impact on portfolio yields and on the number of clients served. It did not, however, influence overall financial performance measures. The next hypothesis in null form is *Hypothesis 3, H0: MFIs in*

which the positions of CEO and board chair are split do not perform better than those in which the position is not split.

Given the specific organizational type of MFI, representatives of other stakeholders such as donors, clients, employees, and creditors may also be included on the board to balance varying interests. The corporate governance literature in stakeholder system countries—for example, Germany, Japan, and France—studies the role of firms' other stakeholders, such as creditors, employees, customers, suppliers, and the government (Hoshi, 1998; Schmidt and Tyrell, 1997). This literature acknowledges the existence of various agency conflicts, but argues that the success of the firm is in the best interests of all parties. For the German corporate governance system, in which employee representation on the supervisory board is typically legally mandated, Fauver and Fuerst (2006) find that labour representation provides a powerful means of monitoring and reduces agency costs, especially in firms with a greater need for coordination.

Previous evidence shows that having bankers on the board improves the value and performance of German firms, perhaps by reducing the agency costs (Cable, 1985; Gorton and Schmidt, 2000). In the USA, bankers are rarely represented on boards of firms, because shareholder–creditor conflicts have been relatively unimportant (Kroszner and Strahan, 2001).

Unlike most other boards, the MFI board may also include representatives of social investors (when the organization has raised funds in the external markets), donors, and clients. These groups of stakeholders may play a role similar to that of large blocks of stakeholders and may improve efficiency. The interests of each group may not coincide with the interest of the other two groups—for example, investors may prefer better

returns, while donors and clients may prefer outreach, as suggested in Hartarska (2005). However, Mersland and Strøm (2009) do not find that these stakeholder groups influence performance. Therefore, we formulate a fourth hypothesis. *Hypothesis 4. H0*: *The proportion of each group of creditors, clients, and donors on the board does not affect performance*.

2.2 *External factors*

MFIs are remarkably diverse. They operate as regulated or unregulated, and are registered as non-governmental organizations (NGOs), private banks, non-bank financial institutions, or member-owned cooperatives with various costs of ownership (Mersland, 2009). However, Mersland and Strøm (2008) find a minimal difference in performance between shareholder-owned MFIs and other MFIs, and Herrmann and Frank (2002) provide similar evidence for foundation-owned firms versus private firms in Germany.

Regulation may impact MFI performance by changing the internal rules of the organization. Although prudential regulation imposed on MFIs accepting deposits can be justified (Dewatripont and Tirole, 1994), the cost of designing and enforcing regulatory policies to address the specific challenges of microfinance is substantial and may outweigh potential benefits (Steel and Andah, 2003; Theodore and Trigo Loubiere, 2002). Regulation introduces the regulator as an additional stakeholder, and this may lead to mission drift if the need to fulfil regulatory requirements diverts attention away from the objective of serving the poor (e.g., by shifting the focus from serving poor clients to improving capital adequacy ratios); this may hold back the innovation in lending technology that has been the driving force behind MFIs' ability to expand outreach and

serve poor clients (see 'Special Issue on Microfinance', forthcoming in *World Development).* In fact, summary statistics reported by the MicroBanking Bulletins show that regulated MFIs serve wealthier borrowers (www.themix.org).

Several cross-country studies find that regulatory status and regulatory power of the supervisory body have no impact on financial sustainability or outreach (Hartarska, 2009; Mersland and Strøm, 2009). However, Hartarska and Nadolnyak (2007) find that better outreach (measured as the number of borrowers) is associated with higher levels of savings, suggesting an indirect effect of regulation on outreach if regulation is required for deposit-taking activity. The next hypothesis to be tested in its null form is: *Hypothesis 5, H0: Bank regulation of MFIs and the level of regulatory burden in MFIs do not affect performance*.

Competition is another variable to consider. More intense competition may act as a substitute for strong internal governance (Hart, 1983, Schmidt 1997). However, competition may undermine institution-customer long-term relationships (Gorton and Winton, 2003). Competition among mission-driven organizations can improve the match between managers and the non-profit organization they choose to work for, thus improving overall efficiency, as shown by Besley and Ghatak (2004). However, McIntosh and Wydick (2005) show that competition among non-profit lenders exacerbates asymmetric information problems regarding borrower indebtedness and causes more borrowers to seek additional debt, thus creating a negative externality that leads to worse loan contracts for all borrowers. In a follow-up empirical paper, McIntosh *et al.* (2005) show that in Uganda, the entrance of competitors led to a decline in loan repayment and the exit of larger borrowers.

Evidence from countries with competitive microfinance markets in individual countries such as Bolivia and Uganda indicates that too much competition may decrease profitability (as in the case of Bolivia), although it may lower interest rates that borrowers are charged (as in Uganda and Bangladesh), and thus presumably may affect outreach (Porteous, 2006). Cross-country studies are mixed, with some evidence of no impact (Mersland and Strøm, 2009) and weak evidence of positive impact (Hartarska and Nadolnyak, 2007).

Thus, the sixth hypothesis to be tested in the null form is H0: *The intensity of microfinance competition does not affect performance*.

3. Empirical Methodology

The above hypotheses are tested using the following model:

$$Performance_{it} = \alpha + \beta_1 Board\ Size_i + \beta_2 (Board\ Size_i)^2 + \sum_{k=1}^{K} \beta_k\ Board\ Composition + \sum_{l=1}^{L} \beta_l\ External\ Governance_i + \sum_{m=1}^{M} \beta_m Controls + \varepsilon_{i,t} \quad (1)$$

The dependent variable *performance* is chosen to address the challenge of studying organizations with dual objectives and is measured by *outreach efficiency* or, simply put, *efficiency*. The mission of MFIs in particular is to serve as many low-income clients as possible (outreach), while remaining financially viable. Since both non-profit and for-profit MFIs strive to minimize costs, technical efficiency in outreach delivery resulting from a cost-minimization problem is an appropriate dependent variable.

In the banking literature, several studies use this performance measure as the dependent variable in exploring the impact of various governance mechanisms. For

example, studies by Berger and Mester (1997) regarding the impact of board independence on efficiency and by DeYoung *et al.* (2001) on the role of management ownership in bank profit efficiency use a stochastic cost frontier. In its simplest form, this approach posits a stochastic model for a cross-sectional frontier with a two-component disturbance specification: one error term is the usual two-sided noise component, while the other is a one-sided disturbance component associated with inefficiency (Fare *et al.*, 1994). The main advantage of this approach is that it accommodates statistical noise by allowing deviations from the frontier to be associated with both inefficiency and random factors, thus avoiding the possible overestimation of inefficiency.[2]

This approach can accommodate the dual objective of MFIs, because output can be measured in terms of either the dollar value of loans or the number of clients served. When outputs are measured as the number of clients served, the resulting individual technical efficiency coefficients capture the efficiency in serving as many poor clients as possible by minimizing costs.

We first estimate a stochastic translog cost frontier of the form:

[2]Cost frontier analysis implies cost minimization (Kumbhakar and Lovell, 2000). The cost function is of the form $C_i \geq c(y_i, p_i, \beta)$, where C_i is the actual cost of producer i and $c(.)$ is the efficient cost function of output y_i, input prices p_i, and a vector of coefficients. The difference between the actual and the efficient cost is captured in the error term e_i, which consists of two parts: the truly random shock v_i and the cost inefficiency term u_i, which is random but non-negative. While several distributional assumptions about u and v are possible, they are always assumed to be independently distributed:

$$v_i \sim iid\ N(0, \sigma_v^2); \qquad (2)$$
$$u_i \sim iid\ N^+(0, \sigma_u^2).$$

With these specifications, it is possible to derive the marginal density, mean, and variance of $e_i = u_i + v_i$. Using these, an expression for the conditional distribution of u given e can be obtained: $f(u|e)$. Thus, estimating the cost function that incorporates e_i using either MLE or the method of moments provides estimates of the cost inefficiency term, u_i.

$$\ln(C) = \alpha_0 + \sum_j \alpha_j \ln(p_j) + \sum_k \beta_k \ln(y_k) + \frac{1}{2}\sum_j \sum_i \gamma_{ji} \ln(p_j)\ln(p_i)$$
$$+ \frac{1}{2}\sum_k \sum_l \delta_{kl} \ln(y_k)\ln(y_l) + \sum_j \sum_k \rho_{jk} \ln(p_j)\ln(y_k) + \ln u + \ln v \quad (3)$$

where C is total cost, y_k are outputs, p_j are input prices, $\alpha, \beta, \gamma, \delta, and\ \rho$ are parameters to be estimated, $\ln u$ is the inefficiency term assumed to be one-sided (half-normally distributed), and $\ln \varepsilon$ is two-sided, normally distributed. Standard restrictions are imposed by dividing all prices and quantities by the price of physical capital. Individual coefficients of technical efficiency are derived from this equation and are used as the dependent variable to estimate equation (1). Specifically, cost efficiency CE_i, is $E(\exp\{-u_i\}|e_i)$ and technical outreach efficiency is $TE_i=1/CE_i$ and is used to study the impact of governance variables (see Coelli *et al.*, 2005 p. 265).[3]

In equation (3), output is measured as the number of borrowers or number of clients (borrowers and savers) to account for the outreach goal of serving as many clients as possible, as in Caudill *et al.* (2009). For a robustness check, models with the volume of loans as the dependent variable are also estimated. The inputs in the cost function are labour, physical capital, and financial capital. The price of labour is the average annual salary per employee calculated as personnel expense divided by the number of employees. The price of physical capital is the operating expenses minus personnel expenses divided by fixed assets. The price of financial capital is the weighted cost of capital. The total costs (C) are defined as the sum of input prices and quantities.

[3] Battese and Coelli (1995) developed a one-stage model that has gained some popularity, but Greene (2002) argues that these models are developed for only truncated normal distribution, and in cross-country studies, would not represent a substantial improvement over the more traditional technique, which is what we use in this paper.

Recent banking studies argue that firm-specific characteristics and, in cross-country studies, country-specific factors affect efficiency; therefore, MFI-specific variables and country dummies are also included in the cost frontier function (Fries and Taci, 2005; Bos and Kool, 2006). The literature review section also shows that several control variables must be included directly in the cost function, so that the resulting inefficiency is attributed to managerial inefficiency, which in turn is affected by the governance mechanisms.

Therefore, we control for age, size, and portfolio risk levels, as we expect that learning occurs over the life of the MFI and that, with the passage of time, managers gain experience in that institution and environment (Caudill *et al.*, 2009). We include a dummy variable that takes the value of one if the MFI specifically targets women, and zero otherwise, since women have better repayment rates and loans to women may be less expensive (Hulme, 1991, Armendariz and Morduch, 2005). We also include a variable that controls for non-profit status, links with international networks, and the provision of non-financial services, as recent studies have shown that these variables influence the performance of the MFI (e.g., Karlan and Valdiva, 2006).

The cost efficiency estimation, therefore, includes *MFI age* measured in years from the start of microfinance activity, *MFI size* measured in the log of the assets, and *risk* measured as the percentage of the portfolio more than 30 days overdue. Microfinance production technology-specific variables included are *Ownunit*, which takes on the value of one if the MFI is an independent organization (not a branch of a major MFI or a development organization), and zero otherwise; *Purefinserv*, which takes on the value of one if the MFI only provides financial services (since some offer client training and other

services), and zero otherwise; *Intinitiated,* which takes on the value of one if the MFI was created by an international organization; *Gender,* which takes on the value of one if the MFI targets women specifically, and *NGO,* which takes on the value of one if the MFI is registered as a non-profit organization.

The above factors are beyond managerial control, influence efficiency directly, and are included directly in the cost function. The estimated technical efficiency is a result of managerial effort that is affected by governance mechanisms. Therefore, as in Berger and Mester (1997) and DeYoung *et al.* (2001), efficiency coefficients are the dependent variable in a second-stage regression to test how internal and external governance mechanisms influence managers' performance in terms of the efficient delivery of outreach.

4. The Data

The dataset was constructed from publicly available data from www.ratingfund.org. It consists of all available risk assessment reports conducted by five major rating agencies (MicroRate, Microfinanza, Planet Rating, Crisil, and M-Cril), as of June 2007. The methodologies applied by the rating agencies have been compared, and no major differences in how they assess MFIs relevant for this study have been found. Each of the five rating agencies is approved to rate and assess MFIs according to the Rating Fund of the Consultative Group to Assist the Poor (CGAP). The MFIs in the sample opened up their accounts to the careful scrutiny of the rating agencies, and their rating reports are publicly available, because (partial) funding for the rating itself was provided by the Rating Fund.

The willingness of these MFIs to share their financial and organizational data and donors' willingness to make the data publicly available reflect the industry's tendency towards greater transparency. To date, the dataset analysed here remains the highest-quality, publicly available cross-section of data for MFIs worldwide. Alternative data are collected and screened by the Micro Banking Bulletin, but they are not publicly available (nor are they available to researchers), while data collected by the Mix Market are self-reported and incomplete. Moreover, these two datasets do not contain governance data.

The rating reports in the database are from 2000 to 2007, with the majority coming from the last four years. The reports contain financial information for up to four years. Financial values have been annualized and converted to US dollars using prevailing official exchange rates. The rating agencies differ in terms of the information they make available in the reports. Thus, the variables consist of different numbers of observations, which are reflected in the different number of observations in the regressions.

The main dataset consists of 278 MFIs from 60 countries. Since not all MFIs have complete information that can be used to estimate efficiency, and since not all of them provide detailed information on their governance, the data used consist of between 260 to 380 annual observations depending on the model specification, or about 155 MFIs from 45 countries. Table 1 lists all countries and the total number of observations from each country.

Table 2 presents summary statistics for the variables used in this analysis. The first part contains variables used in the cost function. It shows that the average MFI included in the analysis serves 11,378 clients including 9,247 borrowers, and has an outstanding loan portfolio of 4.2 million US dollars. The average annual employee salary is slightly

less than $7,000, the average ratio of non-labour operating expense to fixed capital is 3.4, and the average cost of capital is eight percent. The average MFI age and size is eight and one half years and $2.7 million in total assets, respectively. The average risk, measured as the portfolio at risk overdue more than 30 days, is seven percent. The majority of MFIs are independent institutions (90 percent) and provide only financial services (85 percent). In addition, about one-third were created by international initiators, one-third target women specifically, more than 60 percent operate as non-profits, and one-third are regulated by independent banking authorities.

The estimated technical outreach efficiency coefficients from the stochastic cost frontier used for the second stage of the analysis are presented next. The average values of these coefficients remain almost the same, even when output is measured by the number of borrowers or savers. As previous banking studies demonstrate, efficiency coefficients are higher when output is measured as the volume of loans than when it is measured as the number of clients, but the difference for the average MFI in this sample is only a few percent (53 percent versus 48 percent).

Summary statistics for internal and external governance variables are presented next. *Board size* is measured by the number of board members, and the square term is also calculated and included to capture the possible non-linear impact of this variable. Other internal governance variables include the proportion of clients, employees, donors, and debt holders on the board, and a dummy that controls for a CEO's dual role as the chair of the board. The average board in the sample consists of seven members; stakeholder groups are included as members, but in small numbers only.[4] For example, only eight

[4] *Ex-ante* knowledge of the microfinance industry indicates that stakeholder representation is not very popular on MFI boards (Labie, 2003). Thus, when the rating reports provided information about board

percent of the boards have employee representation and three percent have creditors representation; 11 percent and 12 percent have donor and client representation, respectively (the averages for all boards being seven and nine percent, respectively). This *ex-ante* knowledge indicates that stakeholder representation is not very common in MFI boards, but this representation has been recommended, and it was important to find out if the results would show an impact. Finally, in 10 percent of cases, the CEO is also the chairman of the board, indicating that there is a reasonable separation of management and control but that the role of this duality in microfinance still needs to be explored.

External governance mechanisms include several indexes: an index for the level of competition, an index for the enabling regulatory environment and a dummy variable that takes on the value of one if the MFI is regulated by a banking authority, and an index of corruption perception. The level of competition is measured according to a subjective index using a scale based on competition information provided in the rating reports and compiled by the rater. We subjectively evaluate this information to indicate the level of market competition on a 1-to-7-point scale, with 7 being the most competitive. Since the raters have multi-country experience and have rated dozens of MFIs, we expect that they possess comparative information about countries and markets. Furthermore, since many MFIs have only local or regional coverage, proxies for a national level of competition, such as relative numbers of MFI-clients or a *Herfindahl type index* would be less reliable than this proxy.

Similarly, the influence of the enabling regulatory environment is measured by an index of regulation that takes on values from 1 to 7, where higher levels indicate a more

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members, it was assumed to be worth reporting if some members were representing a special stakeholder group.

mature regulatory environment as judged by the rating agency in the written information provided in the rating report. A dummy variable, which takes on the value of one if the MFI is regulated by an independent banking authority, and zero otherwise, is also included in order to capture the impact of banking regulation in particular. Other controls are per capita gross national income (used to measure the level of economic development), population density, number of existing MFI clients, and country corruption perception index from the Mix-Market database (www.mixmarket.org).

5. Discussion of the results

We first estimate a cost frontier using all observations with available data for the variables entering the cost function (described above). Next, the derived technical efficiency is regressed only on internal, only on external, and on both internal and external governance variables. The regressions are run with the dependent variable obtained from a cost function where output is measured as the number of active clients served (borrowers and savers), and the results presented in the first three columns of Table 3. Next, the procedure is repeated, and the dependent variable contains the technical efficiencies estimated from the cost function where output is measured as the number of active borrowers only and results are presented in the last three columns of Table 3. For a robustness check, the technical efficiency from the cost function where output is measured as the volume of loans is also estimated and used as a dependent variable, with the results presented in Table 4.[5]

[5] We also tested for the possible endogeneity of each of the internal governance variables and then tested for them jointly in the efficiency function (see Wooldridge, 2002), but we did not find evidence of endogeneity. As discussed in footnote (3), an alternative check could be the one-step procedure, but it might not be appropriate. We tried this method but not all models converged, and those that did showed no

Several of the hypotheses based on the literature review are supported by the results. First, we are able to reject the null of *Hypothesis 1*, namely that board size does not affect MFI performance. Preliminary analysis suggested that the impact of board size might not be linear, and that there might be an optimal board size; therefore, this variable is specified in linear and quadratic terms. The results indicate that there is some benefit to a larger board, but that this effect reverses after a certain size. These results are consistent with the literature on boards in banks and non-profits, for which boards are found to be larger than conventional boards. The results also are consistent with the idea that excessively large boards may suffer from free-riding. For the MFIs in the sample, the optimal board size is eight to nine members, which is slightly larger than the sample's average board size of seven members. This result is different from that of the studies, which find no linear impact of board size (Hartarska, 2005; Mersland and Strøm, 2009). The result is also consistent with suggestions by Jensen (1993), who shows that corporate boards with more than seven or eight members are less effective monitors, because agency and coordination/communication costs increase. Moreover, the results here are robust and hold for all regressions with various output measures in first-stage cost function estimation.

We also reject the null of *Hypothesis 2* stating that there is no impact of employees on the board. Specifically, we find evidence that a board with a larger proportion of employees will have a negative impact on efficiency for the specifications that include both internal and external governance variables in Table 4, although not in models with internal governance variables only (but this specification is incomplete). We are able to conclude that in the sample of MFIs we analyze, the costs of effective monitoring may be

evidence of endogeneity.

higher than the benefits from insider knowledge, since the few MFIs with employees on their boards are less efficient than the majority of MFIs that do not have employees on their boards. This result complements previous findings by Hartarska (2005) that client representation is associated with serving more but less poor clients. Another result confirming the lack of benefits of insider knowledge in microfinance is the fact that the dual CEO and board chair position is associated with less efficiency. The null hypothesis (No. 3) of no impact by this variable is rejected across all specifications and supports theoretical arguments for differentiating the position of board chair from that of the CEO.

Evidence related to *Hypothesis 4* on the effects of creditors, clients, and donors on the board is somewhat mixed. Boards with a higher proportion of creditors seem to be more efficient, but MFIs with a higher proportion of donors are less efficient, and the latter lends credence to the argument that donors' presence may ensure continuous funding and thus impede incentives for cost minimization and efficiency, as suggested in Caudill *et al.* (2009). These results suggest that further investigation on the impact of various stakeholders is relevant and should be undertaken.

We are able to reject the null of *Hypothesis 5* of no impact by regulation. MFIs in markets with more mature regulatory systems are less efficient in reaching more clients, but the effect seems to be driven by the ability to reach savers, since the same result is not found in the alternative cost specifications where output is measured by the number of active borrowers or to the volume of loans. This suggests that in countries with a mature regulatory environment, MFIs find it more difficult to attract savers, perhaps because other banks collect the savings instead. This interpretation seems to be confirmed by the fact that MFIs regulated by an independent bank authority are more efficient at reaching

more clients (savers and borrowers, as in Table 3, Models 2 and 3) but less efficient at distributing large volumes of loans (Table 4, Model 3).

The results regarding the role of competition are mixed. When only external factors are included in the regression, we find that MFIs in more competitive environments are less efficient, contrary to expectations for non-financial firms as suggested by Hart (1983) and Schmidt (1997). This result does not hold when we control for internal governance factors, however (Table 4). It seems that in the absence of effective internal mechanisms of control, competition by financial institutions and in MFIs may harm efficiency, since lenders rely on long-term relationship to enforce contracts, and when the value of the relationship is destroyed by more lenders, MFIs are less efficient (Gorton and Winton, 2003; McIntosh and Wydick, 2005). This is consistent with the country-level study by McIntosh *et al.* (2005) that did not account for the impact of internal governance. However, since the measure of competition is an index based on raters' opinions, the lack of impact by this variable suggests that raters may not be as well-informed about the market as expected. This is consistent with recent studies finding that ratings themselves are not a good mechanism of control (Hartarska and Nadolnyak, 2008).

We also find that countries with a higher level of corruption have less efficient MFIs, while other environmental factors do not seem to affect efficiency. Microfinance policymakers argue that the environment matters, but we still do not know which environmental factors do matter and how, and we do not find empirical evidence for the factors studied here. At the same time, the lack of environmental influence may also support the argument that microfinance is less influenced by the macroeconomic

environment, since it applies different loan methodologies, the institutions are often operated by non-profits, and they serve more customers operating in the informal sector than do regular banks (Krauss and Walter, 2008).

6. Conclusions

The popularity of microfinance has attracted a great deal of attention and money, and it has prompted investors, traditional donors, and governments to look for effective control mechanisms to ensure that MFIs make the best use of scarce resources. Recent papers have indicated that governance affects the outreach and sustainability dimensions of performance (Hartarska, 2005; Mersland and Strøm, 2009). This paper evaluates the impact of governance on a measure of performance that combines the dual objectives of MFIs, outreach, and sustainability.

We use a quasi-intermediation approach similar to that used to study cost efficiency in financial intermediaries. MFI performance is measured by individual technical efficiency coefficients, obtained from a stochastic cost frontier estimation, that capture the cost minimization objective and, within the cost function, we measure output as the number of clients (savers and borrowers, and borrowers only) to capture the objective of serving as many clients as possible. The cost efficiency coefficients are transformed into individual technical efficiency coefficients and regressed on internal and external governance variables in a two-step procedure. The internal governance factors are board size, managerial capture of the board, and representation by various stakeholders. The external factors are competition and regulation.

We find that some governance mechanisms suggested by the literature influence MFIs' efficiency. In particular, MFIs in which the positions of the CEO and board chair are merged are less efficient; similarly, MFIs with a larger proportion of insiders on the board are less efficient. We also find that managerial efficiency increases with board size up to nine members and decreases after that. The evidence also suggests that donors' presence on the board is not beneficial, while that of creditors improves efficiency. The latter result should, however, be interpreted with caution, since very few MFIs in this sample have creditors as directors, but perhaps this warrants further study. We do not find consistent evidence that the information on external governance mechanisms provided by rating agencies improves efficiency, although we do find weak evidence that MFIs in countries with a mature regulatory environment could reach more clients, mainly by operating as regulated financial institutions.

These findings indicate that most MFIs have already organized their internal governance relatively successfully. Improvements could be obtained by separating the position of CEO from that of board chair, minimizing the presence of insiders and donors, and perhaps encouraging the presence of creditors, as well as by expanding the board to include no more than nine representatives. Since the poverty level of clients is not captured in this study, future work could build on this approach and develop a measure of performance that also accounts for this dimension of MFI outreach. In addition, further studies and better data are needed to understand how MFI efficiency is influenced by external governance mechanisms, such as competition and regulation.

Table 1

MFIs by country

The first column lists the name of the country, the second column shows how many MFIs from that country are in the sample, and the last column shows the number of annual observations in the sample.

Country name	Number of MFIs	Annual observations
Albania	3	9
Argentina	1	4
Armenia	1	2
Azerbaijan	5	12
Bangladesh	1	1
Benin	3	7
Bolivia	13	46
Bosnia Herzegovina	7	22
Brazil	8	28
Bulgaria	1	4
Cameroon	1	3
Chile	1	4
Colombia	1	2
Croatia	1	2
Dominican Republic	3	8
Ecuador	13	34
El Salvador	4	11
Ethiopia	1	2
Georgia	5	10
Guatemala	3	7
Haiti	1	3
Honduras	6	15
India	13	18
Indonesia	1	1
Jordan	2	6
Kazakhstan	2	3
Kyrgyzstan	1	3
Mexico	10	34
Moldova	1	3
Morocco	3	6
Mozambique	1	3
Nicaragua	7	21
Pakistan	1	1
Paraguay	1	4
Peru	16	58
Philippines	4	4
Romania	1	3
Russian Federation	4	13
Senegal	2	4
Sri Lanka	1	1
Tajikistan	3	5

Togo	1	2
Uganda	1	3
Vietnam	1	3
Yugoslavia	2	8
TOTAL	162	443

Table 2
Panel A
Summary Statistics
Descriptive statistics for variables used to estimate the cost function (equation 3)

Descriptive statistics on the variables used to estimate the cost function, namely the US dollar value of outstanding loans, the number of active clients (both borrowers and savers), the number of active borrowers, the price of labour calculated as the average annual salary, the price of physical capital calculated as the ratio of average annual employee salary, the average ratio of non-labour operating expense to fixed capital, and the average cost of capital calculated as all interest payments on deposits and loans to total liability, the total cost calculated as the input quantities times input prices (or the financing and operating expense), MFI age since starting microfinance activities, the MFI size calculated as the natural logarithm of the total assets, the value of total assets (for illustrative purpose, as only the logarithm form is included in the analysis), the portfolio at risk measured as loans overdue for more than 30 days, a dummy variable indicating that the MFI is an independent entity and not part of an international organization, a dummy variable indicating that the MFI provides only financial services, a dummy variable to indicate that the MFI was set up by an international organization, a dummy variable for targeting women, and a dummy variable for being an NGO.

Variable	Observations (No)	Mean	Std. Dev.	Min	Max
Variables in the cost function					
Volume of loans ($US)	496	4,200,021	5,601,365	28,173	35.9 mln
Number of active clients	481	11,378	26,542	113	419,514
Number of active borrowers	503	9,247	16,429	113	159,907
Price of labour (average annual salary)	503	6,966	4,064	195	26,376
Price of physical capital	503	3.345	5.064	–0.23	67.65
Price of financial capital	503	0.088	0.202	0	1.10
Total Cost ($US)	497	1,151,588	1,484,592	16,615	19.2 mln
MFI age (years)	496	8.5	5.9	0	39.0
MFI size (ln[total assets])	496	14.8	1.3	10.7	18.8
MFI Assets ($US)	496	5,540,225	8,979,175	42,638	144 mln
Risk (PAR>30 days)	496	0.069	0.093	0	0.681
Ownunit	496	0.905	0.293	0	1
Purefinserv	496	0.851	0.357	0	1
Initiated by int'l org	496	0.371	0.484	0	1
Gender	496	0.363	0.481	0	1
NGO	496	0.613	0.488	0	1

Table 2
Panel B
Descriptive statistics for variables used to estimate equation (1)

Descriptive statistics on the predicted technical efficiency coefficients from the stochastic cost frontier with three different measures of output, namely technical efficiency (TE) coefficients obtained from a cost function where output was measured by the number of active clients (borrowers and savers), by the number of active borrowers, and as the dollar value of outstanding loans. Descriptive statistics on external governance variables are on an index of competition created from the rating reports' analysis of the competition, with a 1-to-7 scale, where 1 is the least competitive and 7 is the most competitive; an index for the enabling regulatory environment on a 1-to-7 point scale, where higher levels indicate a more mature regulatory environment also described by the rating agency, a dummy variable that takes on the value of one if the MFI is regulated by a banking authority, and zero otherwise. Descriptive statistics on the internal governance variables are on the dummy that takes the value of one if the CEO is also the Chair of the board, on the board size measured by the number of board members, on the square of board size, on the proportions of board members who are clients, employees, donors, or debt holders. Descriptive statistics on macroeconomic variables are on the per capita gross national income (used to measure the level of economic development), on the population density in persons per square km, on the number of existing MFI clients, and on the corruption perception index for each country from the Mix-Market database (www.mixmarket.org).

Variable	Observations (No)	Mean	Std. Dev.	Min	Max
Governance Variables					
TE (output is active borrowers)	496	0.489	0.191	0.212	0.931
TE (output is active clients)	496	0.490	0.210	0.225	0.928
TE (output is volume of loans)	496	0.534	0.178	0.240	0.930
Index of competition	474	4.559	1.663	1	7
Index of regulatory environment	462	4.084	1.662	1	7
Regulated by banking authority	471	0.316	0.466	0	1
CEO is Chair of the board	450	0.107	0.309	0	1
Board size	435	7.078	4.043	0	33
Board size squared	435	66.4	109.7	0	1,089
Proportion board members that are employees	367	0.019	0.130	0	1
Proportion board members that are clients	365	0.086	0.277	0	1
Proportion board members that are creditors	367	0.003	0.029	0	0.25
Proportion of board members that are donors	368	0.070	0.225	0	1
Population density	449	75.686	97.561	6	1,061
GNI per capita	447	1,949	1,523	110	8,350
MFI clients in the country	441	21,891	19	21,914	21,824
Country corruption perception index	434	3.0	0.7	1.8	7.3

Table 3
Regression results from a stochastic frontier cost function,
with three different measures of outputs

The dependent variable is total costs calculated as input quantities times input prices. The cost function was estimated with three different measures of output; in the first column are results from a specification where output is the number of active borrowers, in the second column are results from a specification where output is the number of active clients (borrowers and savers), and the third column contains results from a specification where output is the dollar value of outstanding loans. Other explanatory variables are the price of labour (the average annual employee salary) scaled by the price of physical capital (ratio of non-labour expense to net fixed assets), the price of financial capital (financial costs to liability) also scaled by price of fixed capital, and their relevant interactions shown in (3). Additional controls are MFIs' age in years since the start of microfinance activities, MFI size (natural logarithm of total assets), the portfolio at risk measured as loans overdue for more than 30 days, a dummy variable taking the value of one if the MFI is an independent entity, and zero if a part of an international organization; a dummy variable taking the value of one if the MFI provides only financial services, and zero if it offers other services; a dummy variable taking the value of one if the MFI was set up by an international organization, and zero otherwise; a dummy variable taking the value of one if the MFI targets women, and zero otherwise; and a dummy variable taking the value of one if the MFI is organized as an NGO.

	Cost		Cost		Cost	
Constant	–10.849		–10.889		–11.418	
	(–21.89)	***	(–19.52)	***	(–9.67)	***
Y (output is the number of borrowers)	0.266					
	(8.61)	***				
Y (output is the number of clients)			0.278			
			(8.68)	***		
Y (output is the volume of loans)					0.173	
					(2.78)	***
Price of labour	0.464		0.461		0.368	
	(19.26)	***	(18.12)	***	(14.24)	***
Price of financial capital	0.346		0.334		0.392	
	(18.67)	***	(16.61)	***	(20.14)	***
Y^2	0.079		0.079		0.037	
	(5.70)	***	(6.04)	***	(2.13)	**
Price of labour^2	0.042		0.034		0.062	
	(2.67)	***	(2.07)	**	(3.44)	***
Price of financial capital^2	0.118		0.111		0.111	
	(13.25)	***	(11.34)	***	(12.08)	***
Pr of labour*Price of fin. capital	–0.101		–0.092		–0.107	
	(–10.12)	***	(–7.90)	***	(–10.12)	***
Y* Price of labour	–0.004		–0.011		–0.050	
	(–0.32)		(–0.99)		(–3.43)	***
Y* Price of financial capital	–0.015		–0.014		0.024	
	(–1.90)	*	(–1.73)	*	(2.43)	**
MFI age	0.006		0.001		0.006	
	(1.45)		(0.23)		(1.38)	
MFI size	0.634		0.636		0.641	
	(23.83)	***	(23.37)	***	(10.37)	***
Risk	0.231		0.061		0.066	
	(1.25)		(0.30)		(0.34)	
Ownunit	0.014		0.015		0.009	
	(0.14)		(0.15)		(0.08)	
Purefinserv	0.092		0.072		0.042	
	(1.18)		(0.92)		(0.49)	
Initiated by int'l org	0.041		0.075		0.048	
	(0.72)		(1.30)		(0.75)	
Gender	0.093		0.120		0.273	
	(1.50)		(1.90)	*	(4.17)	***
NGO	–0.003		0.056		0.010	
	(–0.05)		(0.95)		(0.16)	
Observations	461		443		468	
Chi-squared	8,386.91		8,199.92		7,577.20	

t-statistics in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 4
Outreach efficiency regressed on internal and external governance variables

The dependent variables are technical efficiency coefficients obtained from specifications of the cost function with outputs measured by the number of clients or borrowers.

Internal governance variables are the board size measured by the number of board members, and its square term, the dummy variable that takes the value of one if the CEO is also the chair of the board, and zero otherwise, and the proportions of board members who are clients, employees, donors or debt holders. External governance variables are an index of competition created from rating reports' analysis of the competition, with a 1-to-7 scale, where 1 is the least competitive and 7 is the most competitive; an index for the enabling regulatory environment on a 1-to-7 point scale, where higher levels indicate a more mature regulatory environment also described by the rating agency, a dummy variable that takes on the value of one if the MFI is regulated by a banking authority, and zero otherwise. Macroeconomic variables are the per capita gross national income (used to measure the level of economic development), the population density in persons per square km, on the number of existing MFI clients, and the corruption perception index for each country from the Mix-Market database (www.mixmarket.org).

	Dependent variable is technical efficiency (output is active clients)			Dependent variable is technical efficiency (output is active borrowers)		
Constant	0.245	0.658	0.339	0.298	0.648	0.345
	(3.42***	10.18***	5.64***	(4.84)***	11.17)***	6.38***
Internal Governance						
Board size	0.060		0.088	0.044		0.060
	(2.97)***		(7.21)***	(2.61)***		(5.36)***
Board size squared	–0.003		–0.005	–0.002		–0.003
	(2.65)***		(7.33)***	(2.33)**		(6.03)***
Prop of board members that are employees	–0.006		–0.247	–0.002		–0.085
	(0.07)		(4.75)***	(0.03)		(1.79)*
CEO is Chair of the board	–0.025		–0.129	–0.003		–0.083
	(0.68)		(4.50)***	(0.09)		(2.58)**
Proportion board members that are clients	0.066		0.034	0.063		0.054
	(1.62)		(0.75)	(1.54)		(1.28)
Prop. board members that are creditors	1.311			1.528		
	(10.77)***			(9.72)***		
Proportion board members that are donors	–0.067		–0.113	–0.042		–0.079
	(1.82)*		(4.12)***	(1.10)		(2.74)***
External Governance						
Index of competition		–0.012	0.009		–0.017	0.000
		(1.75)*	(1.29)		(2.52)**	(0.00)
Index of regulatory environment		–0.012	–0.024		–0.002	–0.003
		(1.76)*	(3.22)***		(0.32)	(0.35)
Regulated by banking authority		0.064	0.081		–0.010	–0.028
		(2.65)***	(3.18)***		(0.51)	(1.33)
Population density		–0.000	–0.000		–0.000	–0.000
		(1.64)	(1.89)*		(0.45)	(0.17)
GNI per capita		–0.000	–0.000		–0.000	–0.000
		(0.99)	(1.12)		(0.34)	(0.58)
MFI clients in the country		0.001	0.001		–0.001	–0.000
		(0.95)	(0.57)		(0.61)	(0.19)
Country corruption perception index		–0.029	–0.047		–0.028	–0.030
		(1.93)*	3.11***		(2.17)**	(2.21)**
Observations	337	385	268	337	385	268
R-squared	0.13	0.06	0.31	0.12	0.04	0.19

Robust *t*-statistics in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5
Robustness check: Standard efficiency regressed on governance variables

The dependent variable is the technical efficiency coefficient obtained from a cost function where output is measured as the dollar value of outstanding loans. Internal governance variables are the board size measured by the number of board members, and its square term, the dummy variable that takes the value of one if the CEO is also the chair of the board, and zero otherwise, and the proportions of board members who are clients, employees, donors, or debt holders. External governance variables are an index of competition created from rating reports' analysis of the competition, with a 1-to-7 scale, where 1 is the least competitive and 7 is the most competitive; an index for the enabling regulatory environment on a 1-to-7 point scale, where higher levels indicate a more mature regulatory environment also described by the rating agency, a dummy variable that takes on the value of one if the MFI is regulated by a banking authority, and zero otherwise. Macroeconomic variables are the per capita gross national income (used to measure the level of economic development), the population density in persons per square km, on the number of existing MFI clients, and the corruption perception index for each country from the Mix-Market database (www.mixmarket.org).

	Dependent variable is technical efficiency (output is the volume of loans)		
Constant	0.339	0.720	0.421
	(5.85)***	(13.41)***	8.02)***
Internal Governance			
Board size	0.047		0.062
	(2.91)***		6.10)***
Board size squared	–0.002		–0.003
	(2.57)**		(6.72)***
CEO is Chair of the board	–0.013		–0.103
	(0.42)		(4.60)***
Proportion board members that are employees	0.002		–0.050
	(0.03)		(1.11)
Proportion board members that are clients	0.041		0.020
	(1.07)		(0.50)
Proportion board members that are creditors	1.167		
	(11.15)***		
Proportion board members that are donors	–0.048		–0.095
	(1.31)		(2.86)***
External Governance			
Index of competition		–0.021	–0.007
		(3.47)***	(1.09)
Index of regulatory environment		0.001	0.004
		(0.25)	(0.54)
Regulated by banking authority		–0.020	–0.035
		(1.10)	(1.67)*
Population density		–0.000	–0.000
		(0.66)	(0.47)
GNI per capita		0.000	0.000
		(0.25)	(0.86)
MFI clients in the country		–0.001	–0.000
		(0.75)	(0.46)
Country corruption perception index		–0.035	–0.042
		(2.81)***	(3.20)***
Observations	337	385	268
R-squared	0.11	0.07	0.23

Robust *t*-statistics in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.

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